



VEGETATION MANAGEMENT GUIDELINE

Quaking Aspen (*Populus tremuloides* Michx.)

SPECIES CHARACTER

DESCRIPTION

Quaking aspen is a medium-sized, shade intolerant tree that attains heights of 40-70 feet (12-21 meters). This tree has a short, rounded crown and trunks up to about 23 inches (60 cm) wide. Young trees have smooth chalk-white to yellow-green bark. With age, the bark becomes thick, roughened by warty bands, and divided into flattened ridges. Branches are slender and slightly drooping, with hairless red-brown twigs during the first season. Leaves are alternate, deciduous, simple, and broadest near the ovate to heart-shaped base. They are 0.8-3 inches (2-8 cm) long and 0.7-2.8 inches (1.8-7 cm) wide. A short pointed tip found on each leaf has 20-40 pairs of fine teeth along the edges. Leaves are a dark shiny green above and a dull green beneath, and turn golden in autumn. The tree obtained its name because the leaves flutter in the slightest breeze due to long, flattened, slender leafstalks.

SIMILAR SPECIES

Quaking aspen is distinguished from other aspens, poplars and cottonwood by its finely toothed, ovate leaves that lack a white felt of hairs on the under surface and by its whitish bark. Big-tooth aspen (*Populus grandidentata*) has coarsely toothed, nearly circular leaves and bark that is grayish-green. White poplar (*Populus alba*), a non-native tree, has coarsely toothed, ovate leaves that are covered by white felt-like hairs on the lower surface and has grayish-whitish bark. Cottonwood (*Populus deltoides*) has triangular leaves that are nearly flat across the bottom, a flattened leaf stalk and gray bark that becomes deeply furrowed as the tree matures. Quaking aspen should be accurately identified before attempting any control measures. If identification of the species is in doubt, the plant's identity should be confirmed by a knowledgeable individual and/or by consulting appropriate manuals or keys.

DISTRIBUTION

Quaking aspen has one of the widest distributions of any tree in North America. It can be found from northern Alaska to Newfoundland, south to Pennsylvania, Missouri, northern Mexico, and lower California. In Illinois, it is recorded from 38 counties and is most common in the northern half of the state.

HABITAT

Quaking aspen can grow in a variety of soil conditions, including shallow, rocky soil, clay soil, rich soil, or nutrient deficient sandy soil, but grows best in rich, porous, limy soils.



LIFE HISTORY

This rapidly growing tree is one of the most aggressive of the pioneer species. It quickly colonizes recently burned or bare areas and soon establishes dense stands of young trees. Quaking aspens reproduce sexually by seeds and asexually by sending suckers from their extensive lateral roots, forming stands that are clones. Apparently establishment of quaking aspen by seed is uncommon. Establishment of stems by root suckering is much more common. Quaking aspens begin to produce seed at 15-20 years of age and continues for about 50 years, although good seed crops are produced only every 4-5 years. Flowers or catkins appear in April and May before the leaves, and fruits ripen 4-6 weeks later. Staminate and pistillate catkins grow on separate trees and can reach lengths of 1-4 inches (2.5-10 cm). The fruits are produced in elongated clusters of drooping catkins with 0.2 inch (6 mm) long, light green capsules, each of which contains numerous seeds with cottony hairs that allow the seeds to become airborne. Rarely, trees live to be 150 years old.

EFFECTS UPON NATURAL AREAS

Aspen is a problem in some disturbed prairie areas where it forms large clones. It tends to exclude prairie species and provides favorable conditions for other trees and shrubs to become established.

CONTROL RECOMMENDATIONS

RECOMMENDED PRACTICES IN NATURAL COMMUNITIES OF HIGH QUALITY

Initial effort in areas of heavy infestation

Girdling is the preferred management technique if practical. Girdled trees die slowly over the course of 1 to 2 years and girdling minimizes resprouting. Girdling is easiest in late spring or early summer when the sap is flowing and the bark readily peels away from the sapwood. Girdling also may be attempted at other times of the year, although one must be more careful not to girdle too deeply into the sapwood. When girdling a tree, the bark and phloem must be removed from a band around the tree trunk and the xylem must remain intact. If girdled too deeply, the tree will respond as if it had been cut down and will resprout from the roots.

Girdling can be done with an ax, saw, or chainsaw. Two parallel cuts 3-4 inches apart, cutting through the bark slightly deeper than the cambium are needed. The bark is knocked off using a blunt object like the head of an ax. The girdles should be checked every several weeks at first to make sure bark does not develop over the cut area. When big stems are girdled, it is important to cut any small stems present. This minimizes the amount of resprouting. If the trees are too small to be girdled practically, cutting twice in one year is sometimes effective.

Herbicide treatment of cut stumps can control resprouting. Cutting during the dormant season is recommended. Stumps can be treated with Garlon 4 (16% active ingredient) or Garlon 3A (50% solution mixed with water) by spraying or wiping onto cut surfaces of stumps and should be applied soon after cutting. Spraying must be thorough. Garlon 4 should not be applied when there is snow or ice on the ground or on the trunk of the tree. Do not apply Garlon 4 in or over standing water.

In clonal stands in which maximum stem height is approximately 5 feet tall (1.5 m), drip application to stems of Triclopyr herbicide (Garlon 4 in a 16% active ingredient solution mixed with a mineral or plant-oil based carrier) in May or June has had very good results. Return the following summer to treat any stems that may have been missed. Diesel fuel should not be used as a carrier for Garlon 4. Garlon 4 is selective against broadleaf species, so it may be used in areas where desirable grasses are present. Do not apply Garlon 4 if snow, ice, or water are present on the ground or stems. Do not apply Garlon 4 in or over standing water. By law, herbicides may only be applied as per label directions and by licensed herbicide applicators or operators when working on public properties or lands not owned by the applicator or operator. Always apply herbicides backing out of a property to minimize the chance of exposure to the chemical.

Initial effort in areas of light infestation

Girdling or cutting twice in one year should be done as given above.

Maintenance control

Fire can cause resprouting and increase the problem unless a continuous burn program is implemented (with burns at least every other year). Before commencing any prescribed burns, open burning permits must be obtained from the Illinois Environmental Protection Agency and often the local appropriate agencies too. Burns should be administered by persons trained or experienced in conducting prescribed burns, and proper safety precautions should be followed.

Successful burning requires a sufficient quantity of leaf litter and/or grass to provide the fuel base to carry a fire thoroughly under aspen groves. Cutting or girdling and treating canopy trees to eliminate shade, and cutting or mowing suckers on the clone periphery will allow greater sunlight to enter the grove and increase growth of fine fuels needed to carry a fire further into the stand. Repeating this procedure over successive years should eventually reduce the size of the clone. Advantages of fall burning are that there should be dryer fuels and lower ground moisture to carry the fire farther into the clone. Aspen will have lower carbohydrate reserves and be more susceptible to injury from fire in late spring (preferably 1-2 weeks after flowering).

RECOMMENDED PRACTICES ON BUFFER AND SEVERELY DISTURBED SITES

Initial effort in areas of heavy infestation

Same as given above except that herbicides discussed below can be more widely used. At dry sites or in large groves, large trees can be cut during the dormant season and stumps treated with Garlon 4 (16% active ingredient) or Garlon 3A (50% solution mixed with water) by spraying or wiping onto cut surfaces of stumps and should be applied soon after cutting. Spraying must be thorough. Garlon 4 should not be applied when there is snow or ice on the ground or on the trunk of the tree. Do not apply Garlon 4 in or over standing water. Treatment with Garlon 4 and 3A may be at any season, but application during the dormant season reduces the chance of affecting non-target species.

Cut trees should be placed in slash piles and burned in the spring. The burn is critical to remove slash so that resprouts, new germination and smaller diameter stems can be treated more easily in the future. New stems should be treated early in the growing season (June) with a wick application of 50% Roundup (a formulation of glyphosate) to the foliage.

In stands in which tree heights are between 5-6 feet (1.5-2 m) with 1-2 inch (0.5-0.8 cm) diameters use a brush cutter during the dormant season and treat the stumps with Garlon.

In very thick stands in which tree heights are 3-6 feet (1-2 m) an ATV mounted weed wiper (6 ½ foot boom on each side of an ATV, boom set taller than other surrounding vegetation) with 50% Roundup applied to the foliage twice from opposite directions early in the growing season (June) has been shown to control approximately 50 % of the stems.

At sites with moist soil or small stands use a basal bark application of Garlon on small saplings less than 6 inches (15 cm) in diameter, large trees should be girdled in the dormant season as described previously and treated with Garlon 4. Garlon 4 may be used for basal bark treatment on stems 6 inches (15 centimeters) or less in basal diameter by spraying or painting a 20 to 30% solution of Garlon mixed with a mineral or plant-oil based carrier around the base trunk up to a height of 12 to 15 inches (30 to 38 centimeters).

Using a forestry mower in June over large areas will cause aspens to resprout to a height of 3-4 feet by September in Illinois. These resprouts can then be controlled with fosamine (trade name Krenite) herbicide from a boom sprayer. Mowing earlier will make the resprouts too tall for boom application of herbicide in the fall. Later mowings may cause some of the roots not to send up shoots until the following spring, rendering a fall application of fosamine less effective.

Fosamine is an effective herbicide for small saplings and root suckers when applied as a foliar spray according to label directions. A 5-10% solution of Krenite provides excellent control with no visible negative effects on non-target herbaceous vegetation. Thorough coverage with a soft water carrier is required and a nonionic surfactant will improve results when necessary. Coverage of foliage should be complete. Krenite should be applied only in July-September. No effects will be observed during the autumn season following application. Slight regrowth may occur the following season but saplings will die during summer. Fosamine kills only woody species and is non-volatile.

All control methods should be done on a yearly basis to ensure any missed trees are treated. When using herbicides, care should be taken to prevent contacting non-target plants with the herbicide. The herbicide should be applied while backing away from treated areas so as not to walk through the wet herbicide. By law, herbicides only may be applied according to label instructions and by licensed herbicide applicators or operators when working on public properties.

Initial effort in areas of light infestation

Same as in high-quality areas, although managers may prefer to use herbicides as described above for buffer and severely disturbed sites.

Maintenance control

Mowing can be used to maintain trees at a manageable height so that the stand can be managed with other control methods. Prescribed fire is not recommended except to maintain height as in mowing. Nearby seed sources should be removed if possible.

FAILED OR INEFFECTIVE PRACTICES

No effective biological controls that are feasible in natural areas are known.

Use of prescribed burning without other treatments will kill many or most aboveground stems, but will increase the amount, vigor and density of sprouts.

Cutting down large trees without any other treatment is not recommended as it results in vigorous resprouting that creates hundreds of small stems.

REFERENCES

- Barth, E. J. 1989. Aspen control treatments on grasslands in Central Wisconsin. Master's Thesis. College of Natural Resources, University of Wisconsin, Stevens Point, Wisconsin.
- Brown, Lauren. 1986. Audubon society nature guides: trees. Alfred A. Knopf, Inc., New York. 853 pp.
- Converse, C.K. and N. Eckardt. 2000. The Nature Conservancy. Element stewardship abstract for *Populus spp.* The Nature Conservancy. Arlington, Virginia.
- Fuller, G. and G. N. Jones. 1955. Vascular plants of Illinois. University of Illinois Press, Urbana. 549 pp.
- Packard, Stephen. 1987. Complete control of aspen by shallow girdling (Illinois). Restoration and Management Notes 5(1):50.
- Petrides, G. A. 1972. Field guide to trees and shrubs. Peterson Field Guide Series. Houghton Mifflin Co., Boston. 428 pp.
- Rydberg, P. A. 1932. Flora of the prairies and plains of central North America. New York Botanical Garden, New York. 672 pp.
- Swink, F. and G. Wilhelm. 1979. Plants of the Chicago region. Morton Arboretum, Lisle, Illinois. 922 pp.

PERSONAL COMMUNICATIONS

- Apfelbaum, Steve. 1988. Applied Ecological Services, Juda, Wisconsin.
- Betz, Dr. Robert. 1988. Northwestern University of Illinois, Chicago, Illinois.
- Harty, Fran. 1988. Division of Natural Heritage, Illinois Department of Conservation, Springfield, Illinois.
- Martin, Mark. 1988. Wisconsin Department of Natural Resources, Madison, Wisconsin.
- McFall, Don. 1988. Division of Natural Heritage, Department of Conservation, Springfield, Illinois.
- Nyboer, Randy. 1988. Division of Natural Heritage, Illinois Department of Conservation, Springfield, Illinois.
- Packard, Steve. 1989. The Nature Conservancy, Chicago, Illinois.
- Pearson, John. 1988. Iowa Natural Heritage Survey, Des Moines, Iowa.
- Schwegman, John E. 1988. Division of Natural Heritage, Illinois Department of Conservation, Springfield, Illinois.

Written for the Illinois Nature Preserves Commission by:

Jill Kennay and George Fell
Natural Land Institute
320 South Third Street
Rockford, Illinois 61108

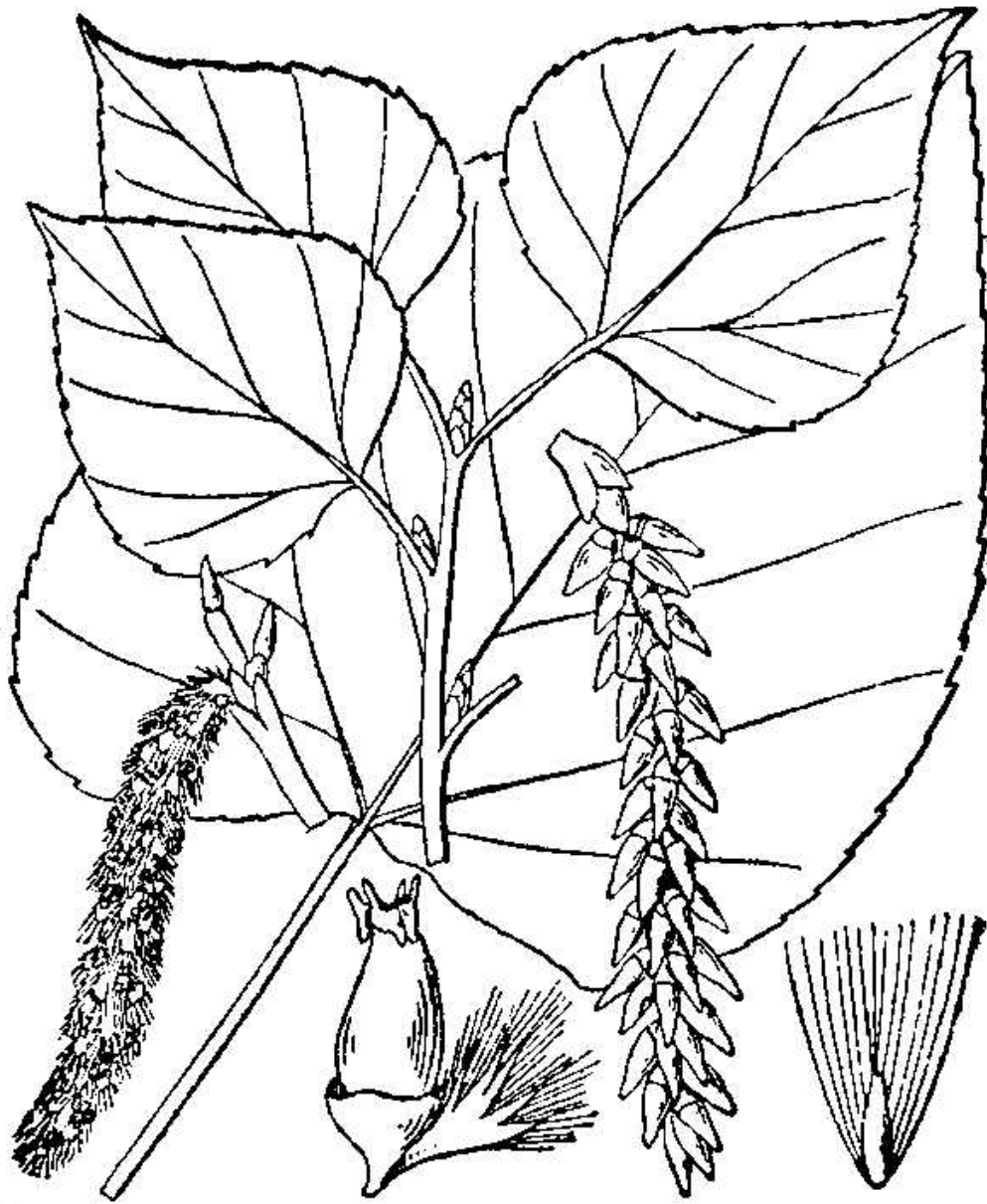
Revised by:

Eric Smith
Illinois Department of Natural Resources
301 S. Date St.
Gibson City, IL 60936

and

Kelly Neal
Illinois Nature Preserves Commission
One Natural Resources Way
Springfield, IL 62702-1271

Equal opportunity to participate in programs of the Illinois Nature Preserves Commission (INP), Illinois Department of Natural Resources (IDNR) and those funded by the U.S. Fish and Wildlife Service and other agencies is available to all individuals regardless of race, sex, national origin, disability, age, religion or other non-merit factors. If you believe you have been discriminated against, contact the funding source's civil rights office and/or the Equal Employment Opportunity Officer, IDNR, One Natural Resources Way, Springfield, Ill. 62702-1271; 217/785-0067; TTY 217/782-9175.



Quaking aspen *Populus tremuloides*

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. Illustrated flora of the northern states and Canada. **Vol. 1: 590.**